

In the Claims:

Listing of all claims:

1 1. (Currently Amended) A method of MIG welding
2 comprising:
3 providing ac power to a weld, wherein the ac power
4 has a negative portion and a positive portion, and the ac
5 power further has a frequency;
6 wherein the negative portion is greater than the
7 positive portion;
8 wherein the frequency is at least 60 Hz; and
9 providing a ~~weld path on at least one workpiece,~~
10 ~~wherein the weld path includes a groove having an angle of~~
11 ~~less than 50 degrees~~ consumable, metal-cored, wire to the
12 weld the wire includes providing a wire wherein the wire
13 comprises a sheath encapsulating a core having a core
14 composition, the core composition comprising a combination
15 of graphite and one or more compounds of potassium, the
16 combination of graphite and compounds of potassium in the
17 core composition not exceeding approximately 5% by weight.

1 2. (Original) The method of claim 1, wherein the
2 frequency is between 90 Hz and 120 Hz.

3-5. (Cancelled.)

1 6. (Currently Amended) The method of Claim 1 ~~5~~,
2 wherein providing the wire includes providing the wire electrode
3 wherein the one or more compounds of potassium comprise K_2MnTiO_4 .

1 7. (Previously Presented) The method of Claim 6,
2 wherein providing includes providing the wire wherein the

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3 combination is selected from the range from about 0.3% to about
4 5.0% by weight.

8. (Cancelled.)

1 9. (Original) The method of claim 1, further
2 comprising providing a weld path on at least one workpiece,
3 wherein the weld path includes a groove having an angle of less
4 than 30 degrees.

1 10. (Original) The method of claim 1, further
2 comprising providing a weld path on at least one workpiece,
3 wherein the weld path includes a groove having an angle of
4 between 20 degrees and 30 degrees.

1 11. (Original) The method of claim 1, including
2 welding at a rate of at least 35 pounds per hour using a single
3 arc.

1 12. (Original) The method of claim 11 including
2 welding at a rate of at least 40 pounds per hour.

1 13. (Original) The method of claim 11 wherein the
2 negative portion is at least twice the positive portion.

1 14. (Original) The method of claim 10 wherein the
2 negative portion is at least 1.5 times the positive portion.

1 15. (Original) The method of claim 1 wherein the
2 weld process begins with a first negative portion having a
3 duration of at least 0.5 seconds.

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1 16. (Original) The method of claim 14 wherein the
2 weld process begins with a first negative portion having a
3 duration of at least 0.75 seconds.

1 17. (Original) The method of claim 1 further
2 including providing a stick-out of about 2 inches.

1 18. (Original) The method of claim 17 further
2 comprising providing a shielding gas at a rate of at least 80
3 cubic feet per hour.

19-48. (Cancelled.)

1 49. (Currently Amended) A MIG welding system
2 comprising:

3 power means for providing ac power to a weld,
4 wherein the ac power has a negative portion and a positive
5 portion, and the ac power further has a frequency; and

6 control means for controlling the power means,
7 wherein the negative portion has a negative amp-seconds and
8 the positive portion has a positive amp-seconds, wherein the
9 control means causes the negative amp-seconds to be greater
10 than the positive amp-seconds, and wherein the frequency is
11 at least 60 Hz, and wherein the weld process begins with the
12 negative portion of at least 0.5 seconds duration; and

13 a source of wire comprising a sheath encapsulating
14 a core having a core composition, the core composition
15 comprising a combination of graphite and one or more
16 compounds of potassium, the combination of graphite and
17 compounds of potassium in the core composition not exceeding
18 approximately 5% by weight.

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1 50. (Original) The system of claim 49, wherein the
2 control means includes means for providing the frequency to be
3 between 90 Hz and 120 Hz.

1 51. (Original) The system of claim 49, further
2 including a consumable, flux-cored, wire, disposed to be provided
3 to the weld.

1 52. (Original) The system of claim 51, wherein the
2 wire is metal-cored.

1 53. (Original) The system of claim 52, further
2 comprising a weld path on at least one work piece, wherein the
3 weld path includes a groove having an angle of less than 50
4 degrees.

1 54. (Original) The system of claim 49, further
2 comprising a weld path on at least one workpiece, wherein the
3 weld path includes a groove having an angle of less than 30
4 degrees.

1 55. (Original) The system of claim 54 wherein the
2 control means for includes means for causing the negative amp-
3 seconds to be at least twice the positive amp-seconds.

1 56. (Original) The system of claim 49 wherein the
2 control means includes means for causing the negative amp-seconds
3 to be at least 1.5 times the positive amp-seconds.

57. (Cancelled.)

1 58. (Original) The system of claim 49 wherein the
2 control means includes means for causing the weld process to

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begin with a first cycle portion having a duration of at least
0.75 seconds.

59-79. (Cancelled.)

80. (Original) A method of controlling
dilution in MIG welding comprising:
providing ac power to a weld, wherein the ac power
has a negative portion and a positive portion, and the ac
power further has a frequency;
controlling the balance of the negative portion
and the positive portion to obtain a desired dilution.

81. (Original) The method of claim 80 wherein the
negative portion is greater than the positive portion.

82. (Original) The method of claim 80 wherein the
negative portion is less than the positive portion.

83. (New) The method of claim 1, further
comprising providing a weld path on at least one workpiece,
wherein the weld path includes a groove having an angle of less
than 50 degrees.